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Acute Flaccid Myelitis (AFM)

Surveillance and Investigation Protocol

WEST VIRGINIA Department of Health & Human Resources BUREAU FOR PUBLIC HEALTH

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I. ABOUT THE DISEASE

A. Clinical Presentation

Acute Flaccid Myelitis (AFM) is a neurologic syndrome characterized by acute onset of limb weakness and distinct abnormalities of the spinal cord gray matter on magnetic resonance imaging (MRI).

Most patients will have sudden onset of loss of muscle tone and reflexes. Some patients, in addition to the limb weakness, may experience facial drooping, facial weakness, difficulty moving their eyes, drooping eyelids or difficulty swallowing or slurred speech. Numbness or tingling is rare in patients with AFM though some patients have pain in their arms or legs. Some patients with AFM may be unable to pass urine. The most severe symptom of AFM is respiratory failure which can happen when the muscles involved with breathing become weak. This can require urgent ventilator support.

AFM is a subtype of acute flaccid paralysis (AFP). AFP includes certain conditions such as paralytic poliomyelitis, AFM, Guillain-Barré Syndrome, muscle disorders, and acute transverse myelitis.

B. Etiologic Agent

AFM can result from a variety of causes, including viral infections (enteroviruses, West Nile virus, Japanese encephalitis virus, Saint Louis encephalitis virus, and adenoviruses), environmental toxins, and genetic disorders.

C. Reservoir

The reservoir is dependent on the etiologic agent.

D. Incubation Period

The incubation period is dependent on the etiologic agent.

E. Mode of Transmission

Depending on the etiologic agent, the infection can be transmitted through respiratory secretions or oral and fecal route.

Adenovirus, Influenza virus, and Enterovirus-D68 (EV-D68) transmission may occur following:

- direct face-to-face contact with a case-patient who is symptomatic;
- shared confined space in close proximity for a prolonged period of time with a symptomatic case-patient; or
- direct contact with respiratory secretions from a symptomatic case-patient.

Other non-polio enteroviruses can be found in the infected person's feces, eyes, nose, and mouth secretions. Transmission may occur by:

- touching or shaking hands with an infected person;
- touching objects or surfaces that have the virus on them, then touching your eyes, nose, or mouth before washing your hands;
- changing diapers of an infected person, then touching your eyes, nose, or mouth before washing your hands; or
- drinking water that has the virus in it.

F. Period of Communicability

The period of communicability is dependent on the etiologic agent. Currently, there is no exclusion criteria (from schools, daycare, or workplace) for persons who develop AFM. However, exclusion criteria may exist for pathogens or diseases that present with AFM, such as concurrent fever.

II. DISEASE CONTROL AND PREVENTION

A. Disease Control Objectives

Reduce the occurrence of AFM by investigating cases to understand the epidemiology of AFM and control disease spread of potential etiologies of AFM.

B. Disease Prevention Objectives

Reduce risk of disease by practicing good personal hygiene and hand washing techniques.

C. Disease Prevention and Control Intervention

Currently, the etiology of AFM is uncertain. However, the following interventions are good measures to prevent AFM.

1. There is not a specific vaccine that prevents AFM. It is recommended to be up to date on all recommended vaccinations, particularly the polio vaccine.
2. Minimize risk of mosquito-borne illnesses by using repellant when in high-risk areas and eliminate stagnant and standing water especially near dwellings.
3. Washing hands frequently helps stop the spread of infection. Use proper hand hygiene before touching food, after going to the bathroom, blowing your nose, changing a baby's diaper, or touching animal, an animal's food, urine, or feces, and before and after taking care of a sick person or a cut or wound.

D. Disease Treatment

There is no specific chemoprophylaxis for AFM.

There is no specific treatment for AFM. However, CDC is working with national experts and updates the AFM Clinical Management (https://www.cdc.gov/acute-flaccid-myelitis/hcp/clinical-management.html) as new information becomes available.

III. DISEASE INVESTIGATION

A. Criteria for Case Ascertainment

An illness that meets any of the following criteria should be considered a possible case of AFM and reported to public health authorities:

- A person with clinical **AND** laboratory/imaging criteria for reporting; **OR**
- A person whose death certificate lists AFM as a cause of death or a condition contributing to death; **OR**
- A person with autopsy findings that include histopathologic evidence of inflammation largely involving the anterior horn of the spinal cord.

Clinical Criteria for Reporting

- A person with onset of acute flaccid (low muscle tone, limp, hanging loosely, not spastic or contracted) limb weakness.

Laboratory/Imaging Criteria for Reporting

- A magnetic resonance image (MRI) showing a spinal cord lesion in at least some gray matter* and spanning one or more vertebral segments, **AND**
- Excluding persons with gray matter lesions in the spinal cord resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.

**Terms in the spinal cord MRI report such as "affecting gray matter," "affecting the anterior horn or anterior horn cells," "affecting the central cord," "anterior myelitis," or "poliomyelitis" would all be consistent with this terminology.*

Epidemiologic Linkage Criteria for Reporting

Not applicable.

Vital Records Criteria for Reporting

- Any person whose death certificate lists acute flaccid myelitis as a cause of death or a condition contributing to death.

Other Criteria for Reporting

Autopsy findings that include histopathologic evidence of inflammation largely involving the anterior horn of the spinal cord spanning one or more vertebral segments.

B. Case Definition and Case Classification

Clinical Criteria
- An illness with onset of acute flaccid (low muscle tone, limp, hanging loosely, not spastic or contracted) weakness of one or more limbs, **AND**
- Absence of a clear alternative diagnosis attributable to a nationally notifiable condition

Laboratory/Imaging Criteria
Confirmatory laboratory/imaging evidence:
- MRI showing spinal cord lesion with predominant gray matter involvement* and spanning one or more vertebral segments, **AND**
- Excluding persons with gray matter lesions in the spinal cord resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.

Presumptive laboratory/imaging evidence:
- MRI showing spinal cord lesion where gray matter involvement* is present but predominance cannot be determined, **AND**
- Excluding persons with gray matter lesions in the spinal cord resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.

Supportive laboratory/imaging evidence:
- MRI showing a spinal cord lesion in at least some gray matter* and spanning one or more vertebral segments, **AND**
- Excluding persons with gray matter lesions in the spinal cord resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities.

** Spinal cord lesions may not be present on initial MRI; a negative or normal MRI performed within the first 72 hours after onset of limb weakness does not rule out AFM. Terms in the spinal cord MRI report such as "affecting mostly gray matter," "affecting the anterior horn or anterior horn cells," "affecting the central cord," "anterior myelitis," or "poliomyelitis" would all be consistent with this terminology.*

Epidemiologic Linkage
Not applicable.

Other Classification Criteria
- Autopsy findings that include histopathologic evidence of inflammation largely involving the anterior horn of the spinal cord spanning one or more vertebral segments.

Case Classifications
Confirmed
- Meets clinical criteria with confirmatory laboratory/imaging evidence, **OR**
- Meets other classification criteria.

Probable

- Meets clinical criteria with presumptive laboratory/imaging evidence.

Suspect

- Meets clinical criteria with supportive laboratory/imaging evidence, **AND**
- Available information is insufficient to classify as probable or confirmed.

Note: To provide consistency in case classification, review of case information and assignment of final case classification for all patients under investigation (PUIs) for AFM is done by the CDC.

C. Reporting Timeframe to Public Health

Report patients suspected of AFM to the local health department as soon as possible, but within 1 week of identification. Send all information about patients who meet the clinical and laboratory/imaging criteria for AFM regardless of laboratory results.

D. Outbreak Recognition

Since 2015, West Virginia reported 2 cases of AFM in 2016 and 1 case in 2019. No cases were detected in 2020. An outbreak of AFM is suspected when there is an unusual increase in the number of cases. Cases may be epidemiologically linked by person, place, or time.

E. Healthcare Provider Responsibilities

1. Be vigilant and suspect AFM when presented with a patient, particularly a child, who has sudden onset of limb weakness, loss of muscle tone and reflexes. See https://www.cdc.gov/acute-flaccid-myelitis/hcp/clinicians-health-departments/evaluation.html for evaluation guidance.

2. Using the Job Aid for Clinicians: How to report a suspected AFM case to the health department (cdc.gov) initiate diagnostic testing by:
   a. Obtaining MRI, AND
   b. Collecting specimens, such as cerebrospinal fluid (CSF), blood, stool, and respiratory specimens from patients as early as possible in the course of the illness, preferably the **day of onset of limb weakness**. Specimens collected early in the illness have the best chance of yielding a diagnosis.

      Note: CDC will conduct routine testing and typing of CSF, respiratory specimens and stool for enterovirus/rhinovirus, and poliovirus testing of stool specimens to rule out the presence of poliovirus. Pathogen-specific testing should continue at hospital or state public health laboratory and may include CSF, sera or whole blood, stool, and respiratory specimens.
   c. Work with the local and state health departments to coordinate submission of specimens for testing at CDC.
   d. For guidance on specimen collection, see **Laboratory Testing** below.

3. Report all patients suspected of AFM to the local health department (LHD).
   a. Complete the **AFM Patient Summary Form** (Word, pdf) at https://www.cdc.gov/acute-flaccid-myelitis/downloads/patient-summary-form.docx. For instructions on how to complete the form, see https://www.cdc.gov/acute-flaccid-myelitis/downloads/patient-summary-form-instructions.pdf.
   b. The form should be completed by, or in conjunction with, a clinician who provided care to the patient during the neurologic illness. A form that has some information pending (e.g., hospital or health department laboratory results) or under investigation should still be sent as soon as possible. Pending results can be provided to CDC when they become available.
   c. Send the completed *AFM Patient Summary Form,* laboratory information (regardless of test results), neurology consult notes (if any) and imaging results (MRI with at least some gray matter lesions in the spinal cord excluding persons with gray matter lesions in the spinal cord resulting from physician diagnosed malignancy, vascular disease, or anatomic abnormalities) to the LHD as soon as possible so cases can be evaluated in a timely manner.

F. Laboratory Responsibilities

For information about specimens to collect and shipment instructions to CDC for *patients under investigation* for AFM and *patients who are deceased*, see https://www.cdc.gov/acute-flaccid-myelitis/hcp/specimen-collection.html.

Upon collection of appropriate specimens, prepare and store specimens as instructed.
1. Contact the DIDE epidemiologist on-call at (304) 558-5353 ext. 2 or WV Office of Laboratory Services (OLS) at (304) 558-3530 when specimens are ready for shipment to CDC.
2. Use dry ice and recommended shipping container for shipment of specimens. The local health department or regional epidemiologist can assist in finding supplies locally.
3. Package and ship overnight on dry ice to CDC so that it arrives at CDC on Tuesday through Friday. **Do not send specimens on Friday or over the weekend**.
4. A completed copy of the AFM Patient Summary Form should be included with the shipment.

G. Local Health Department Responsibilities

1. Prior to the occurrence of an AFM case:
   a. Educate healthcare providers about AFM and how to detect it.
   b. Educate healthcare providers about reporting AFM, including the importance of prompt reporting.
   c. Periodically review the laboratory supplies and materials (including shipping materials) needed for AFM testing. Make sure the healthcare providers, including the local health department, have ample unexpired supplies.
2. When a suspected AFM case is reported:

a. Assist the healthcare provider in completing the Acute Flaccid Myelitis Patient Summary Form. It is best to request the healthcare provider who manages the patient's neurologic condition to fill in the form. Instructions to complete the AFM Patient Summary form is found at https://www.cdc.gov/acute-flaccid-myelitis/downloads/patient-summary-form-instructions.pdf.
b. Obtain pertinent medical records, including but not limited to history and physical examination, admission notes, MRI image and/or MRI reports, CSF results, and other pertinent laboratory results.
c. Notify the DIDE epidemiologist on-call when an AFM case is suspected.
d. Collect the completed *AFM Patient Summary Form* and medical records from the healthcare provider and submit to DIDE.
   - Pending results should not delay submission of the form. Partially completed forms are acceptable. Laboratory results can be added to the form at a later date.
   - Follow up on pending results and/or partially completed forms as necessary and update DIDE as new information becomes available.

3. Long-term follow-up of confirmed and probable AFM cases:

Patients with confirmed or probable AFM shall be contacted by the local health department at 2, 6, and 12 months after the onset of limb weakness to collect information on outcomes after their AFM illness.

a. At the time of the 2-month follow-up, the LHD will also collect complete medical records which includes:
   - admission and discharge notes
   - neurology and infectious disease consult notes
   - MRI report
   - vaccination registry data
   - laboratory test results
   - discharge summary
b. Send complete medical information for each confirmed and probable case of AFM to DIDE.

H. State Health Department Responsibilities

1. Train regional epidemiologists and LHD staff on the importance of prompt detection, identification, and reporting of AFM by healthcare providers.
2. Educate the WV DHHR BPH Health Statistics Center about autopsy and death certificate criteria for ascertaining and reporting AFM.
3. Coordinate education of healthcare providers with LHDs.
4. Assist local health jurisdictions and healthcare providers in investigating and reporting cases of AFM.
5. Notify the CDC at AFMinfo@cdc.gov to identify and classify cases.
6. Provide guidance and facilitate the submission and testing of specimens to CDC. For testing and shipping information, see https://www.cdc.gov/acute-flaccid-myelitis/hcp/specimen-collection.html. CDC will conduct routine testing and typing of CSF, respiratory specimens and stool for enterovirus/rhinovirus, and poliovirus testing of stool specimens to rule out the presence of poliovirus. Pathogen-specific testing should continue at hospital or state public health laboratory and may include CSF, sera or whole blood, stool, and respiratory specimens.

7. Inform healthcare providers and LHDs that AFM case reports will be reviewed and classified by the CDC. After expert review, the CDC will return the patient classification back to the state health department. Relay the information to the clinician and LHD.
8. Update AFM information sheets and protocol as new information becomes available. Develop and send out Health Advisories or Health Alerts as necessary.
9. Review and close case investigations. Summarize surveillance data and surveillance indicators periodically and share with public health partners including CDC.

I. Occupational Health

1. Assure that recommended vaccinations are up to date.
2. Practice proper hand hygiene and cough etiquette.

IV. DISEASE SURVEILLANCE

A. Public Health Significance

A total of 665 confirmed cases of AFM were reported in the U.S. between 2014 and August 31, 2021, with peaks occurring in 2014, 2016, and 2018. One death was reported in 2017.

Numerous tests have been conducted but no specific viral or bacterial etiology has been implicated as the primary cause of AFM. Testing protocols for AFM biomarkers are being developed to identify mechanisms for AFM.

B. Disease Surveillance Objectives

1. To identify cases promptly.
2. To determine the incidence of AFM in West Virginia.
3. To define the epidemiologic characteristics of AFM cases.

C. Surveillance Indicators

1. Report on proportion of cases with complete information.
2. Report on proportion of cases with specimens collected.

V. REFERENCES

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